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e-Infrastructure for the European Research Area A roadmap

**Wim Jansen DG INFSO F3
Research Infrastructure**



European Commission

"The views expressed in this presentation are those of the author and do not necessarily reflect the views of the European Commission"



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■ Contents

- Current achievements – GÉANT and Grids
- eInfrastructures – vision WHY WHAT and HOW
- Preparations for FP7
- Current state of 'play'



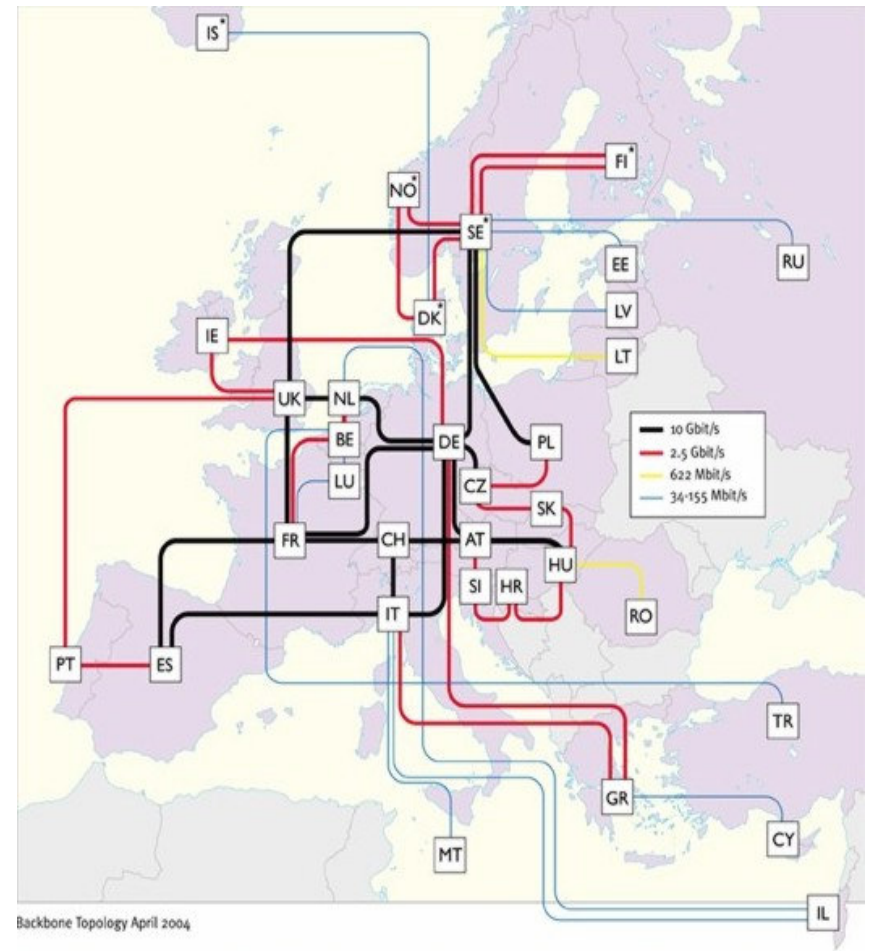
■ Developments and achievements

- Deployment of the pan-European GÉANT Research Network (including a global perspective)
- Promotion of large scale IPv6 validation testbeds
- Grid concept proven in eScience application pilots
- Strengthening of Europe's position in Grid middleware development and Grid research
- First steps taken towards maturing Grid technologies for industrial use
- Contribution to standardisation
- Grid deployment side by side with networking deployment - eInfrastructure

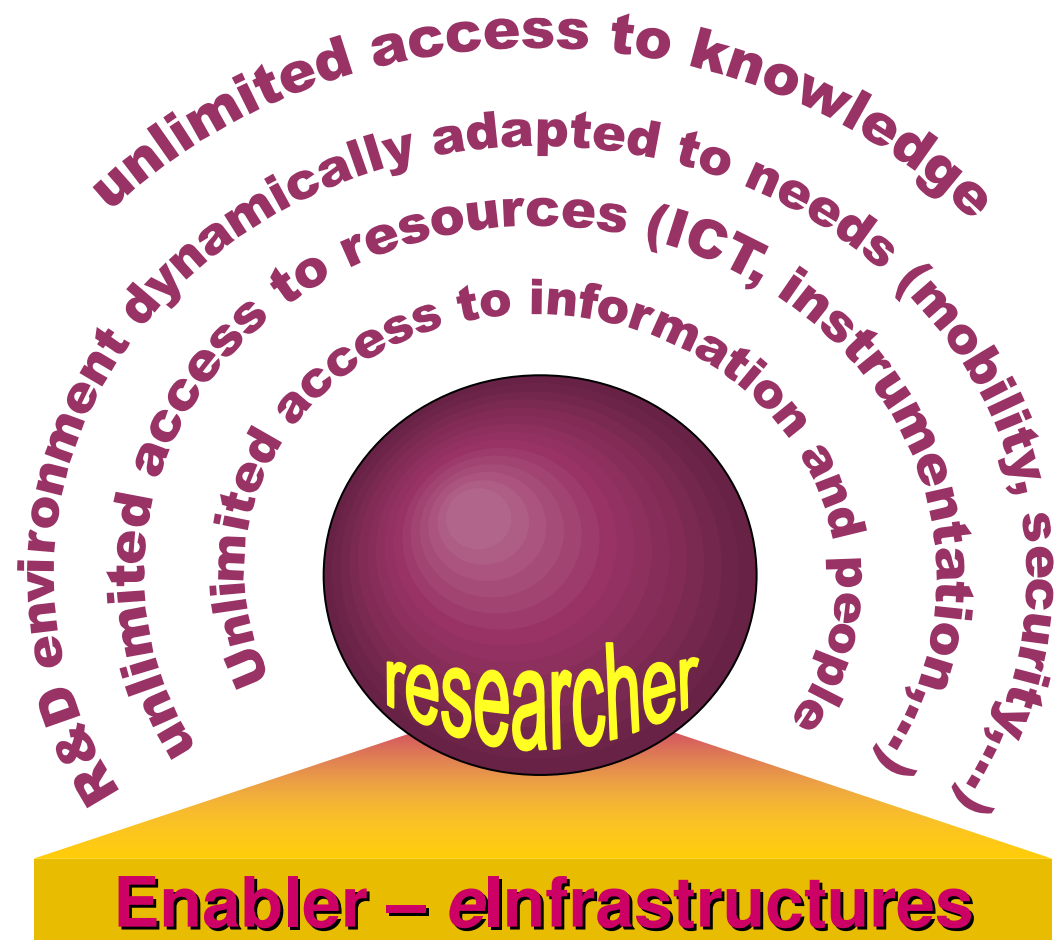




- World leading Research Network
- Connecting more than 3900 Universities and R&D centers
- Over 34 countries across Europe >30 million users
- Connectivity to NA, Japan, ...
- Speeds of up to 10 Gbps + Hybrid Networking (light paths)
- Serves millions of end-users + *eScience* Projects
- The model: A 3-tier Federal Architecture
- Many european schools are also connected (dependent on country)



■ Researchers: Fast growing Needs



Researcher: the most precious capital and the centre of all developments!

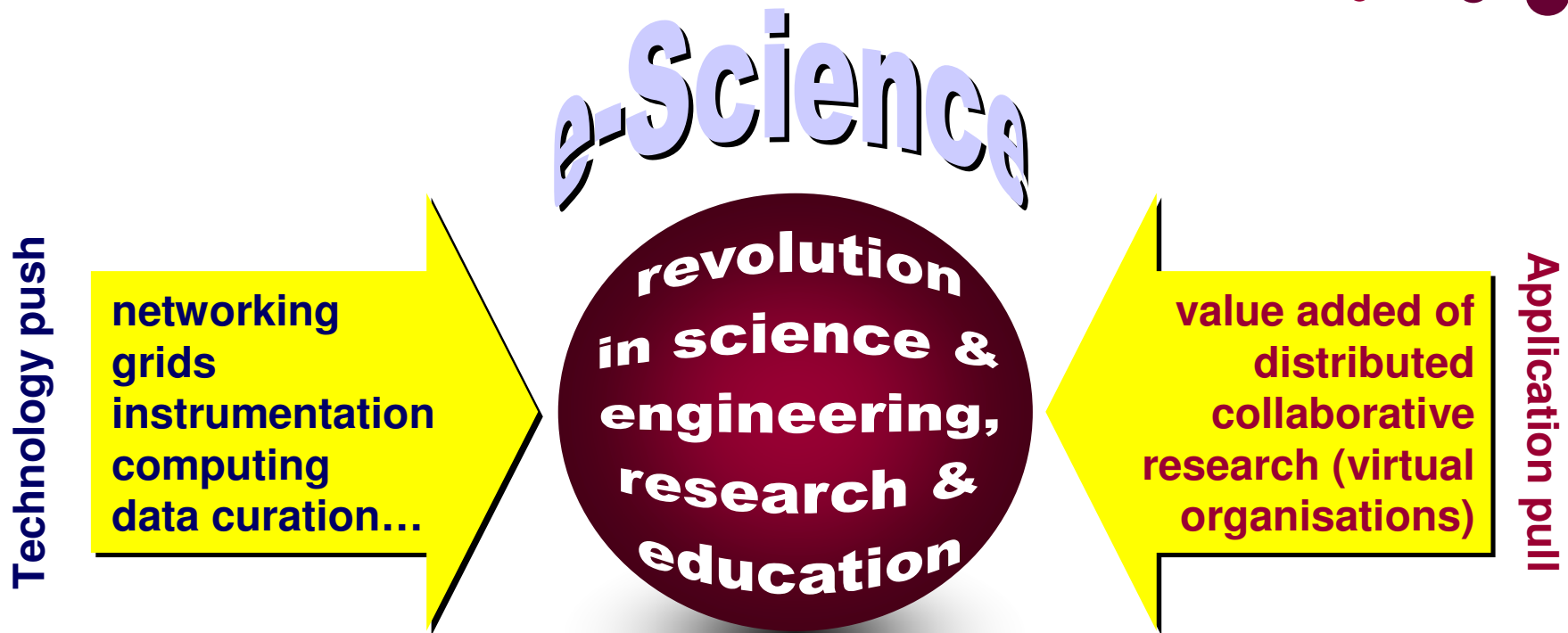


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■ A new way of doing Science



a new way for all scientists to work on research challenges that would otherwise be difficult to address



■ Global collaboration in Science



■ Sharing of resources

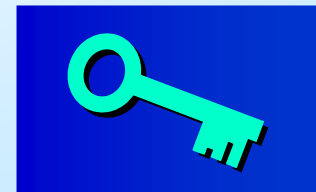


Resources can be
physical, virtual, single
or multiple sited

Resources can
be distributed
world-wide

Resources can be of any
information type (storage,
computing, networking,
instrumentation, etc)

Access to them needs to be
provided in a secure, coordinated,
seamless, dynamic and
inexpensive way



e-Infrastructure



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■ Virtual research organisations



■ Advanced Grid infrastructures



Human Society

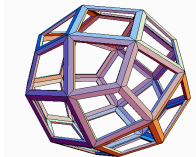
Grid system

Sharing of resources, production efficiency



Basic elements

repeated assembling of basic
elements into organisations



people / computers

environment resources / ICT based resources



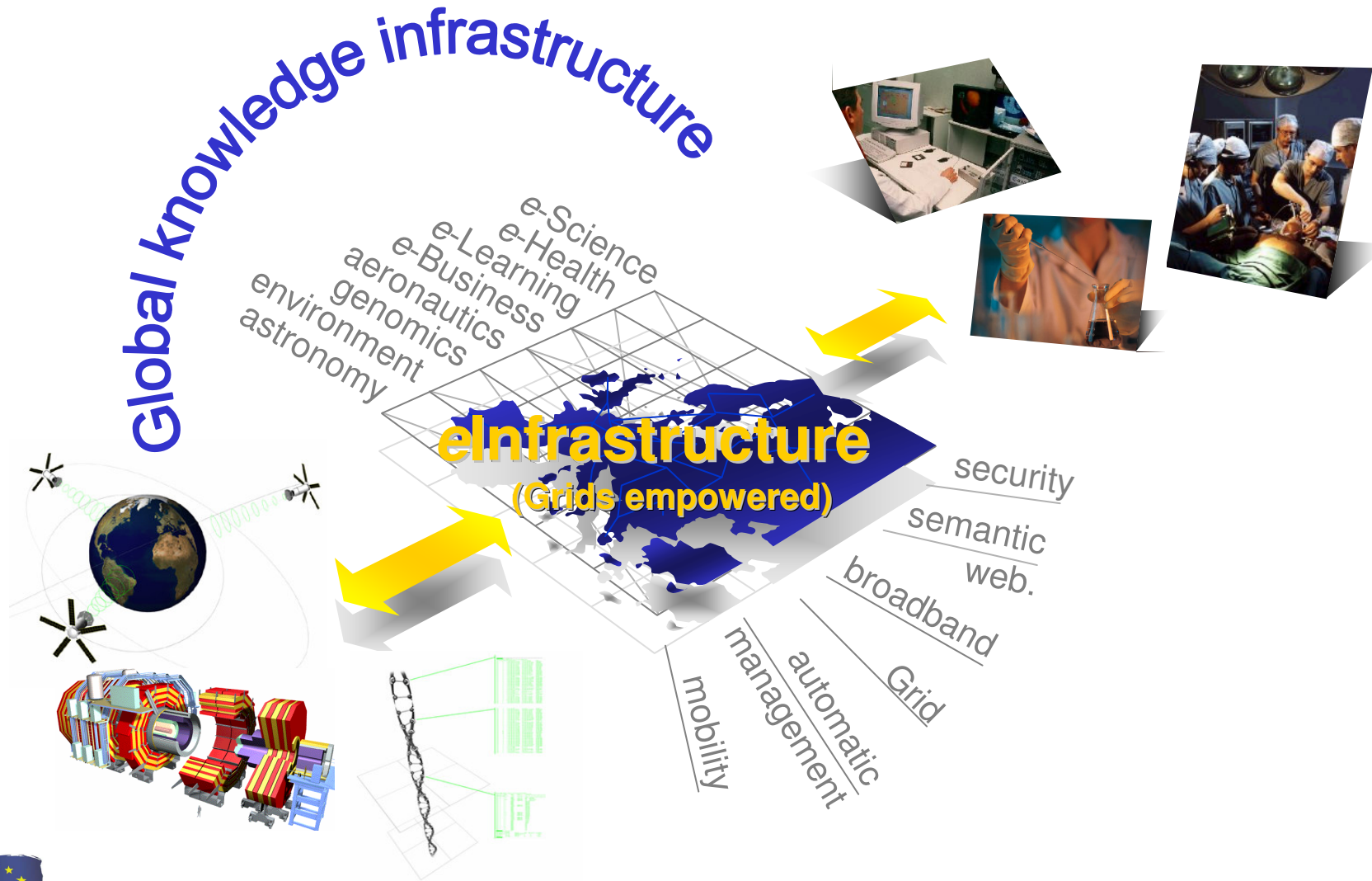
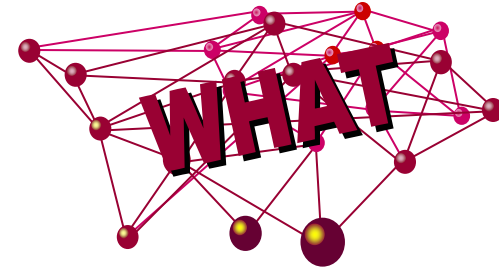
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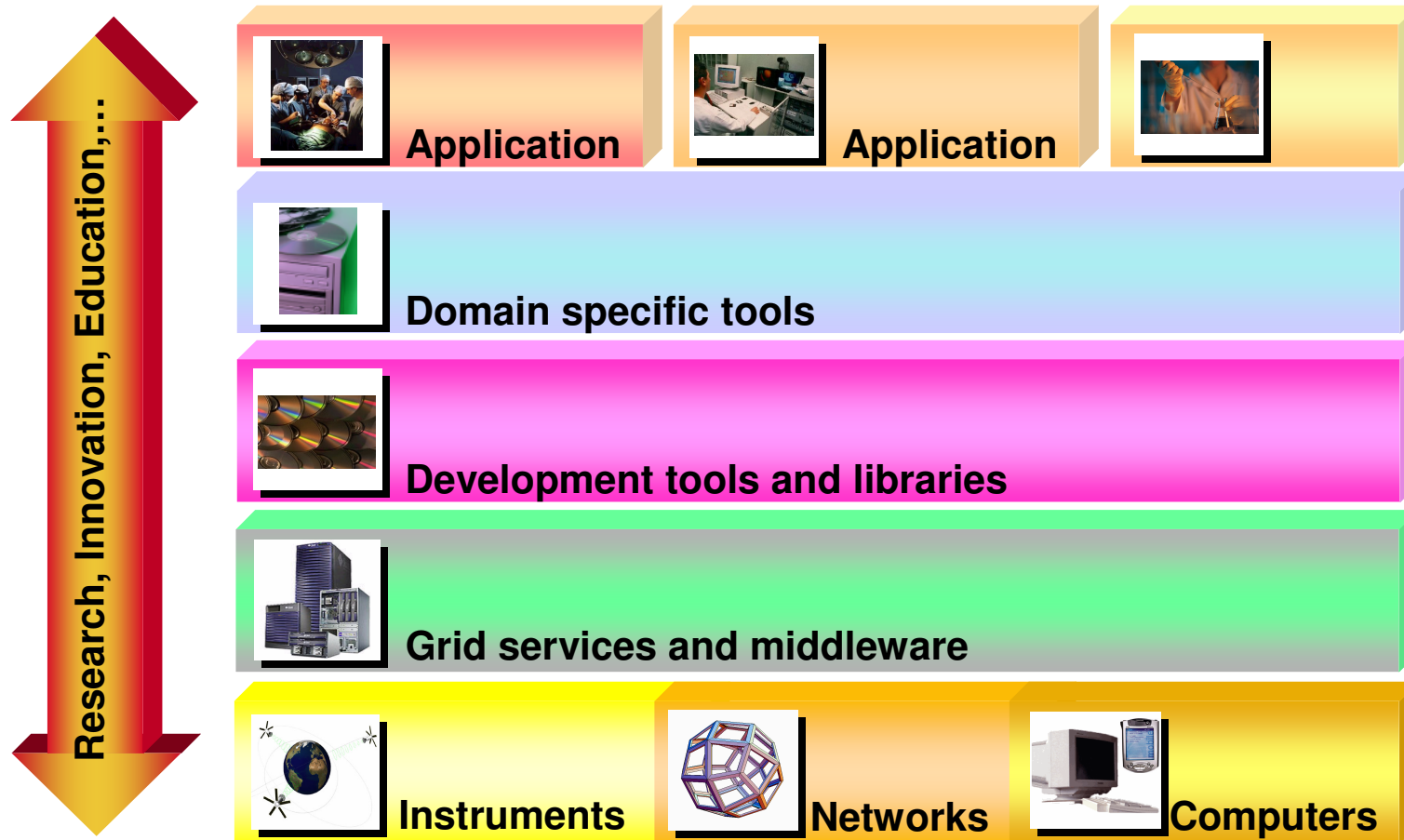
e-Infrastructure – essential for Europe



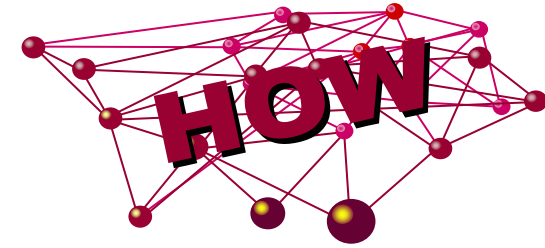
■ e-Infrastructure



set of persistent services and processes bringing the power of distributed ICT based resources to a virtual community



■ How to address e-Infrastructures



Fostering **communities of practice** which lead to **evolution, shaping and stabilisation** of new scientific and technological paradigms
(**virtuous cycle of innovation**)

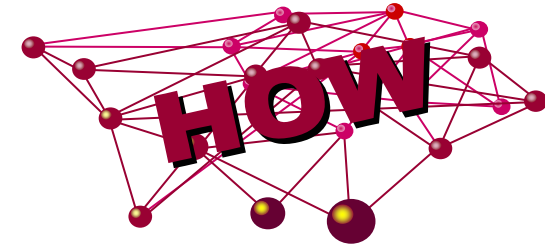
Exploiting mutual benefits: **research organisations shape technology**, as much as **technology shapes research organisations and research practices**

Huge amounts of data are required to store enduring knowledge to be able to access it 'anywhere, anytime'

From: Meteorology, bio-informatics, radio-astronomy (=storage, transfer and processing of data) to Large scale GRID based testbeds beyond eScience: eLearning eBusiness. eCulture eHealth.



■ How to address e-Infrastructures



Fostering **coordination** and **synergies** with **national initiatives**,
fighting **digital divide**

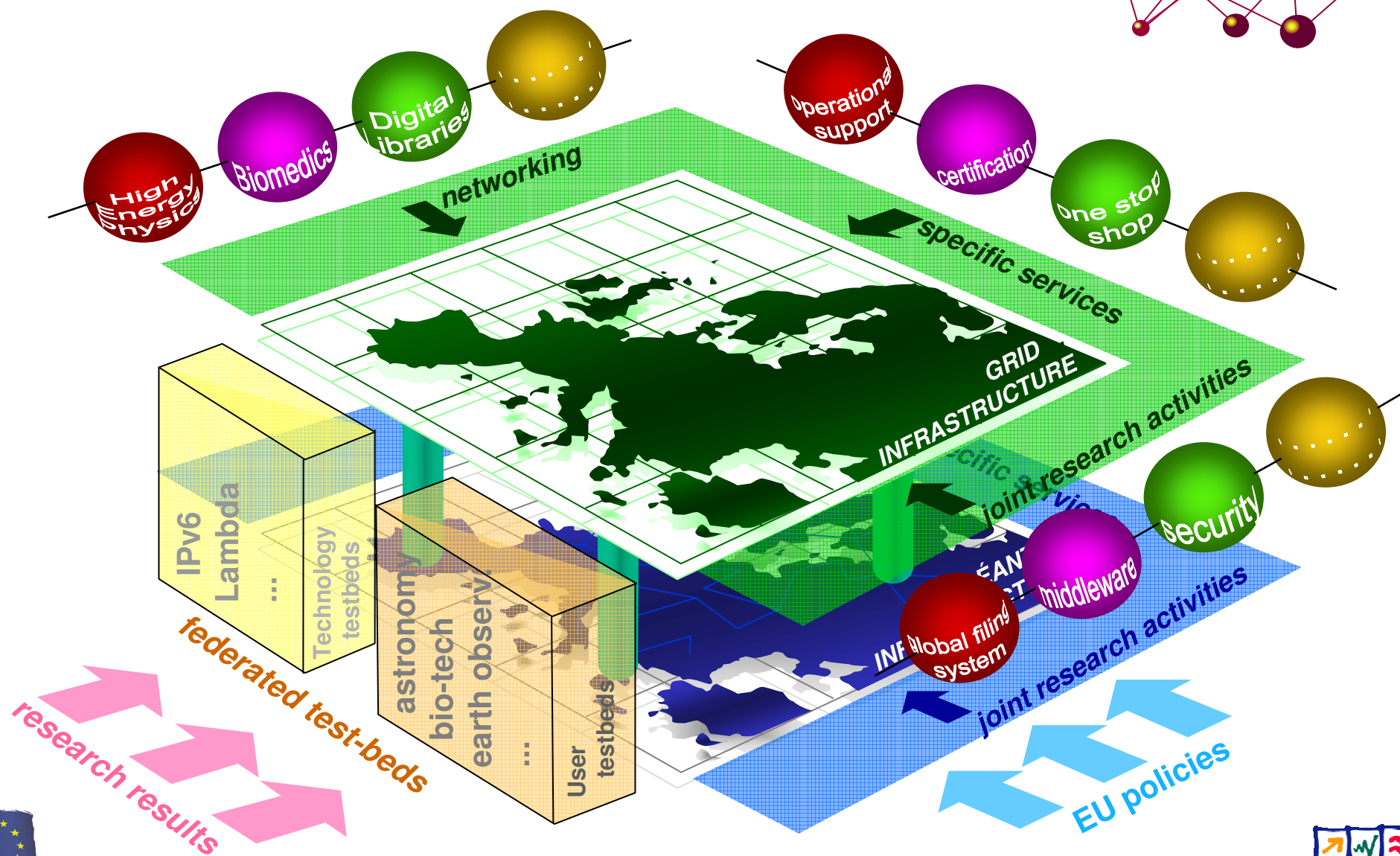
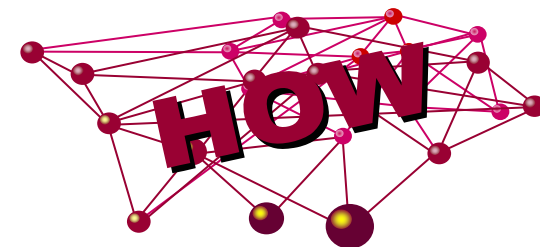
Virtual collaboration, virtual presence, virtual labs, simulations,
gaming and role playing to share knowledge and skills. Lifelong
learning.

This all requires an **ambitious** cross-discipline collaboration (by
researchers *and* Commission)

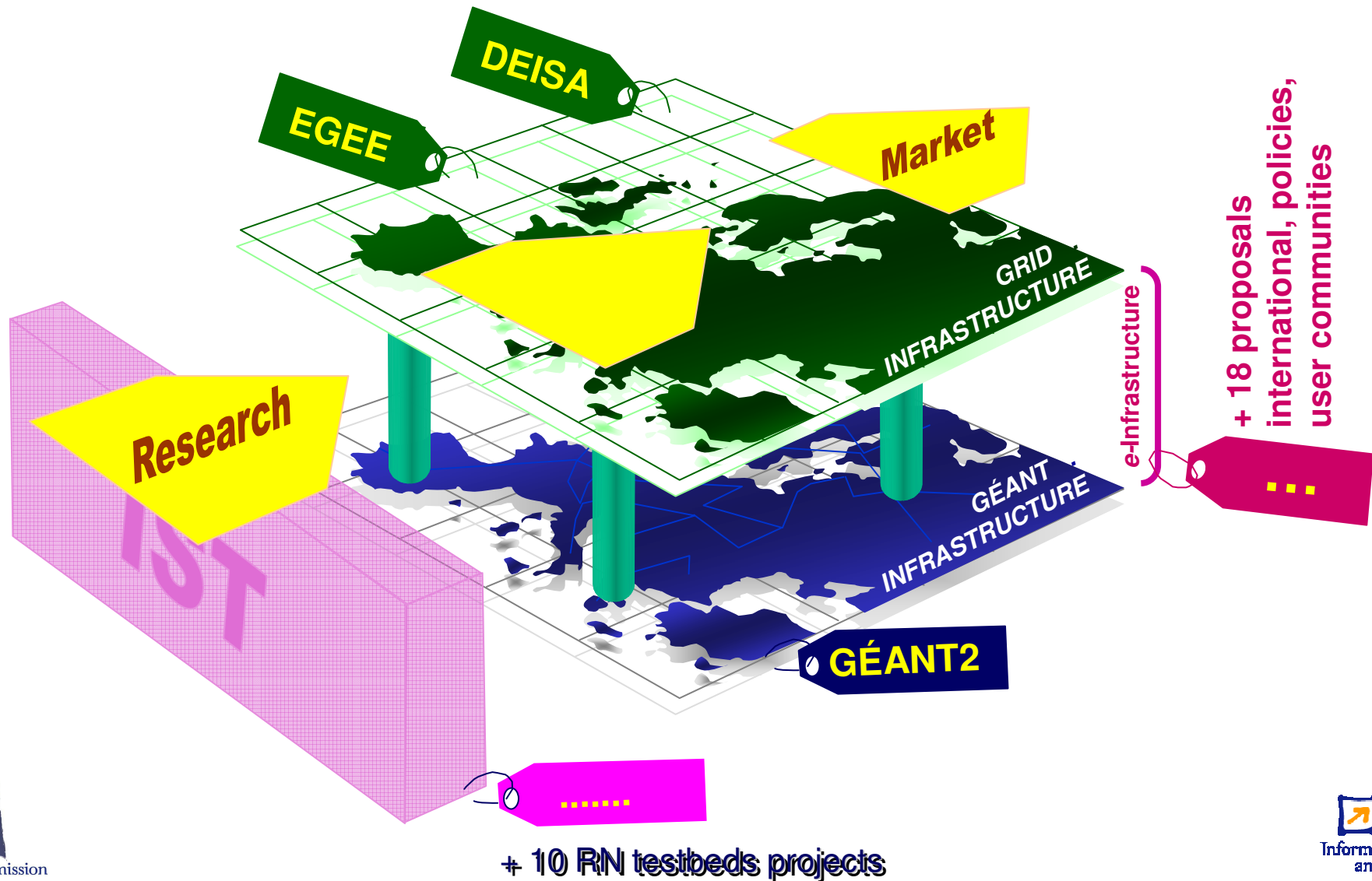
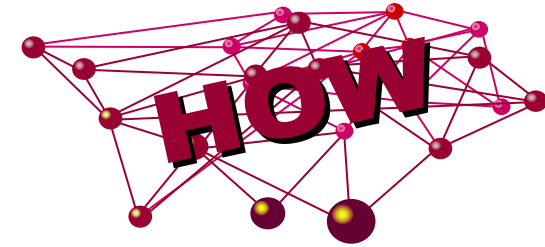
**Patience, spirit, mutual understanding and recognition, joint
development**



■ e-Infrastructure - Implementation blocks



■ e-Infrastructure - Strategic building blocks

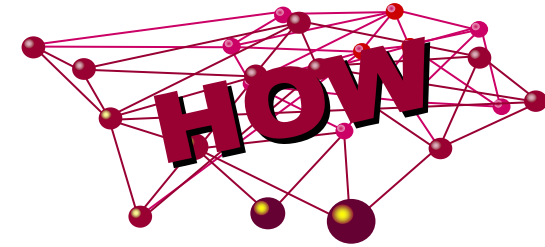


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■ World leading GÉANT / Grid infrastructures



Striving for world leadership

*“Five-Year Assessment:
1999-2003 – Research and
Technology Development in
Information Society Technologies”*

GÉANT is acknowledged as
leading the world.
Europe is a pioneer in Grid
empowered infrastructures.
ICT based infrastructure, namely
GÉANT and GRID, need
reinforcement and expansion in
FP7.



■ Workshop on Scientific repositories

Conclusions:

- There is a large, but by no means comprehensive, deployment of Digital Repositories in Europe and elsewhere.
- They currently contain several million objects, of many types, such as indexes, articles, books, theses, audio-visual materials, original scientific data, e-learning materials etc.
- A large fraction of these objects is Open Access (i.e. can be accessed without copyright restrictions).
- For other items, such as journal articles, access may be subject to conditions applied by the publisher.
- Most Digital Repositories today are based at institutions, with searches carried out on a single repository.
- In some countries there are initiatives to federate these Institutional Repositories and enable searches to be carried out over the combined holdings.



■ Conclusions

- There is an internationally accepted standard (OAI-PMH) for metadata.
- Whilst there are already a number of successful examples of Digital Repository systems, the architecture, middleware and metadata standards to support Digital Repositories are under continual development.
- Digital Repositories are expected to form an integral part of the e-Infrastructure for research in the future.



■ Recommendations

1. A co-ordinated set of strategic studies should be undertaken.
2. The majority of content will be sourced at the institutional level. Institutions should be encouraged to set up Institutional Repositories and to encourage their researchers and authors to deposit their material.
3. Consideration should be given to making the depositing of research results (publications, datasets, images, models or simulations) in accordance with the principles of Open Access publishing mandatory.
4. All countries in Europe should be encouraged to set up national programmes.
5. In the short to medium term, some demonstrator/testbed projects should be undertaken to demonstrate trans-national access.



■ Recommendations

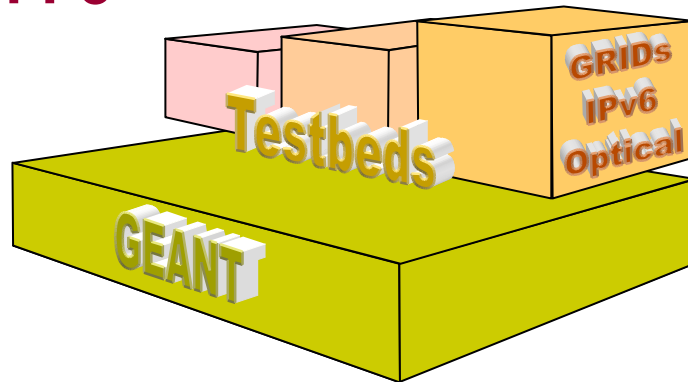
6. At the pan-European level, it is essential to plan now for a knowledge infrastructure as an integral component of the e-infrastructures under FP7.
7. The use of widely-adopted metadata standards should be encouraged in order to enable inter-operability
8. The technology, middleware, content and organisational methods developed for the support of Digital Repositories for research will be of value in other sectors, for example, e-learning, e-health, e-government and e-commerce.
9. The workshop was asked to consider GÉANT as a possible model for a pan-European DR infrastructure (both at organisational level and exploiting the benefits of a layered infrastructure - network/grid/knowledge layer).



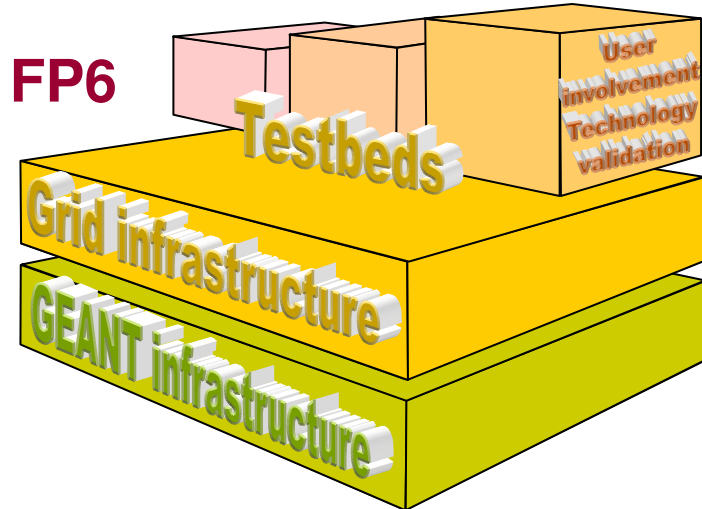
■ From FP5 to FP7 in e-Infrastructures



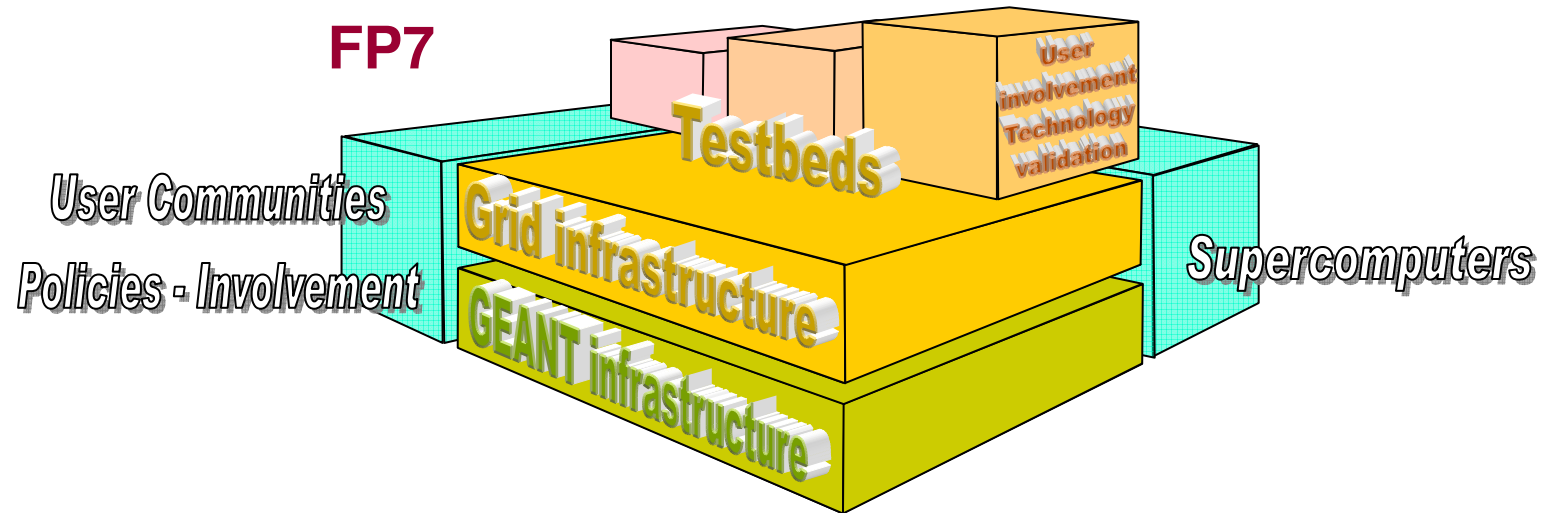
FP5



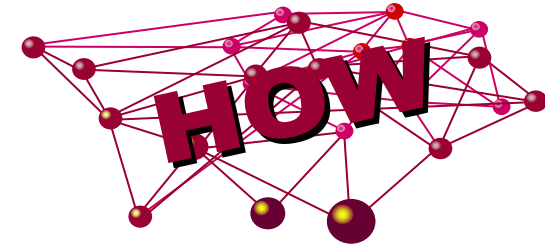
FP6



FP7



■ FP7 plans



- Continuation and further development of current actions



Current Instruments

GÉANT

Grid infrastructure Digital libraries

Supercomputing

- New Infrastructures



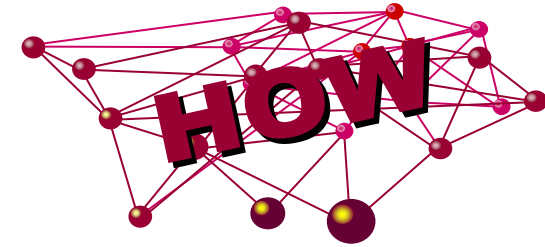
New instruments
Strategic roadmaps

ESFRI

**Reinforce the budget for Research Infrastructures !
Reinforce liaison with Thematic Priorities !**



■ e-Infrastructure in FP7



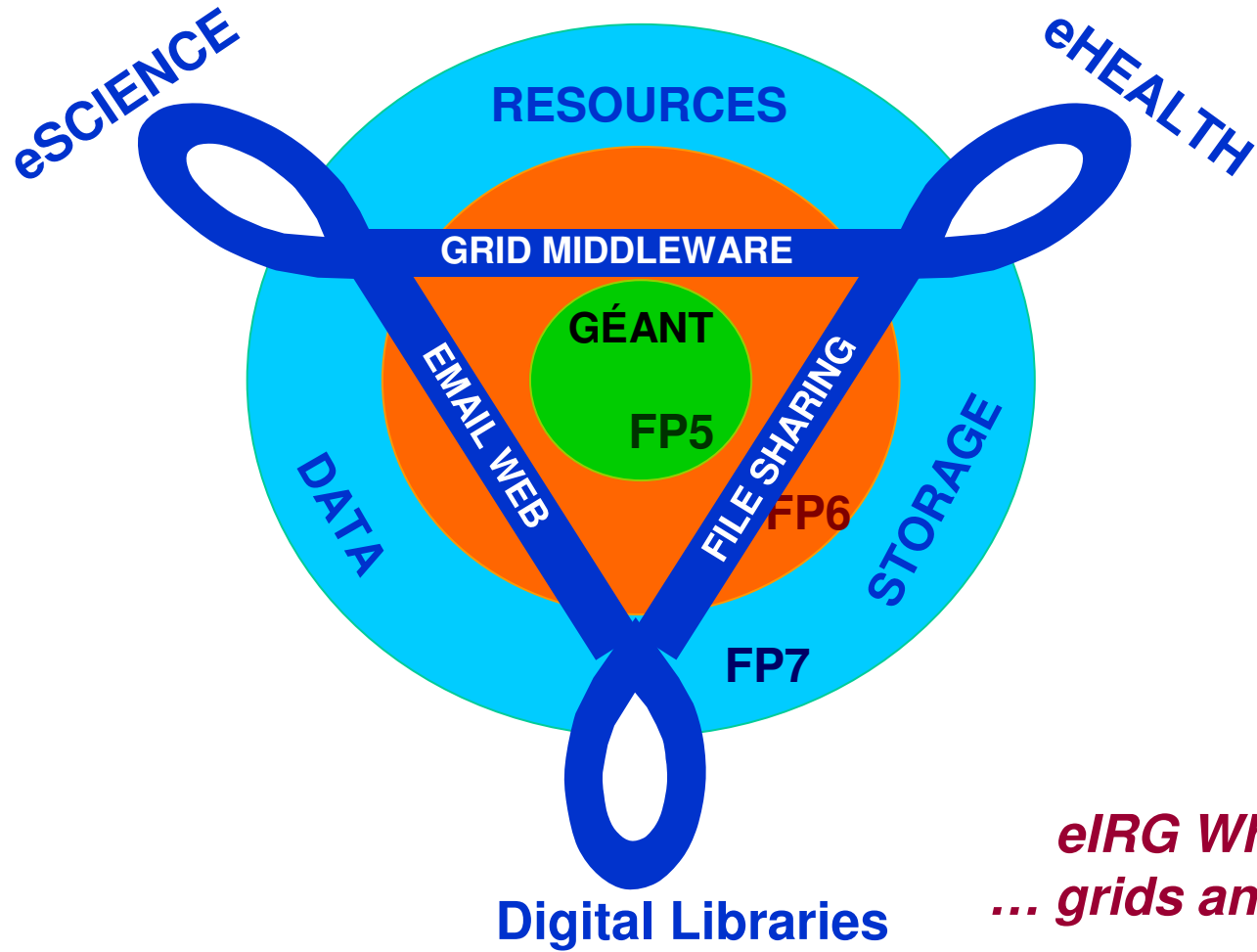
Specific Programme

....to support in a coordinated way digital libraries, archives, data storage, data curation and the necessary pooling of resources, at European level, to organise the data repositories for the scientific community and future generations of scientists. The aspects of enhanced trust and confidence of e-Infrastructures will be addressed.

..fostering the further development and evolution of high-capacity and high-performance communication (GÉANT) and grid empowered infrastructures as well as of European high-end computing capabilities stressing the need to support the reinforcement of world class distributed supercomputing facilities, data storage and advanced visualisation facilities. The activities also aim at fostering the adoption by user communities,



■ e-Infrastructure in FP7



*eIRG White Paper
... grids and e-matter...*

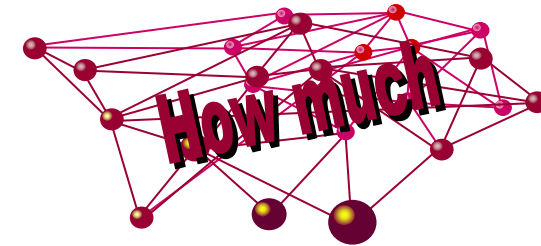


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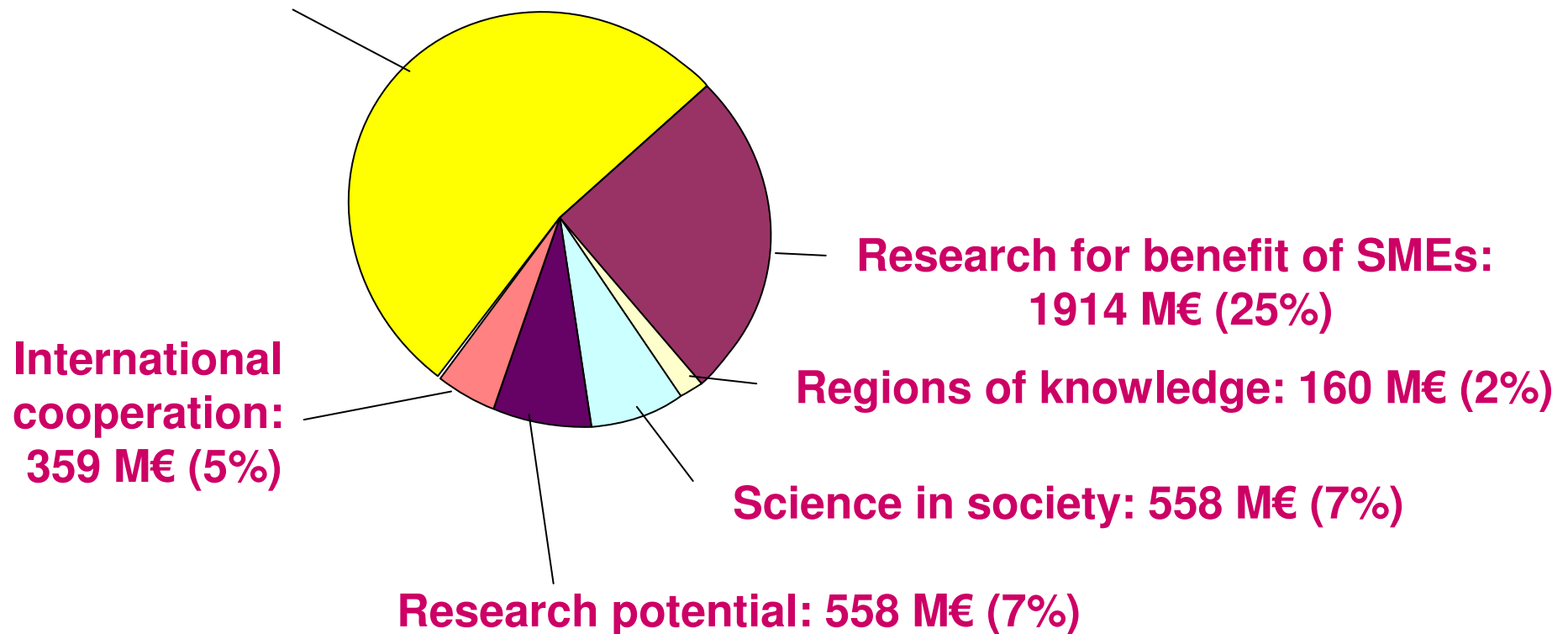


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■ The Capacities Specific Programme of FP7 (Commission proposal)



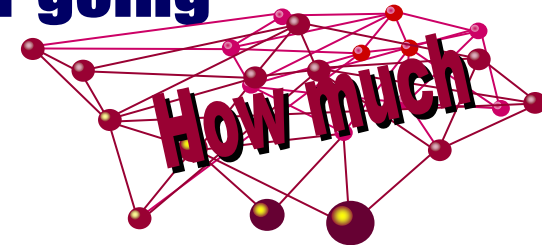
Research infrastructures: 3987 M€ (54%)



http://europa.eu.int/comm/research/future/documents_en.cfm



■ Discussions on FP7 financial resources are on-going



- Total proposed FP7 financial resources by Commission:
~73 €B
- European Council Dec 2005 meeting on EU financial perspectives suggested FP7 financial resources to adjust to ~50 €B



■ Conclusion

Connect ★ Communicate ★ Collaborate

Wim.Jansen@cec.eu.int

■ Further info on e-Infrastructures

Web page
www.cordis.lu/ist/rn/



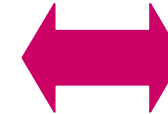
Workshops



Newsletter



Brochures



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